

Meeting III:

Recursion + tuples, lists, dictionaries

15.06.2017

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Structure

Key points of the Meeting III: English meeting

- Quick recap of Meeting II
- Recursion
- Tuples
- Lists
- Dictionaries
- Meeting V = Midterm!
- Meeting III 10 Words
- Office Hours II – this time collective struggle
- Preparation for Midterm!

Recap of Meeting I & Meeting II

- Variables
- Types of variables
- For loops
- While loops
- Conditional statements
- Functions
- Functions: Definitions
- Methods
- Bisection search

Declarative and Imperative knowledge!

Breakthrough example

Recursion

Recursion is a way of programming or coding a problem, in which a function calls itself one or more times in its body.

Recursion: finding factorial

```
def iterative_factorial(n):  
    result = 1  
    for i in range (2, n+1):  
        result *= i  
    return result
```

Iteration

VS

```
def recursive_factorial(n):  
    if n == 1:  
        return 1  
    else:  
        return n*recursive_factorial(n-1)
```

Recursion

Recursion

A recursive function has to terminate to be used in a program. A recursive function terminates, if with every recursive call the solution of the problem is downsized and moves towards a base case. A base case is a case, where the problem can be solved without further recursion. A recursion can lead to an infinite loop, if the base case is not met in the calls.

Tuples, lists, dictionaries/dicts

Tuple: ()

```
ninjaTurtlesTuple = ('Michelangelo', 'Leonardo', 'Donatello', 'Rafael')
```

- Empty tuple: ()
- Important property: It is ordered
- Can index: `ninjaTurtlesTuple [1] = 'Leonardo'`
- Immutable (we can't add 'Splinter' and we can't change 'Rafael' to 'Shrek')
- Mix of element types, it could be:

```
ninjaTurtlesTuple = ('Michelangelo', 'Leonardo', 'Donatello', 'Rafael', 3, 4.5)
```

- Funky stuff: `ninjaTurtlesTuple[1:2] = ('Leonardo',)`

List: []

```
ninjaTurtlesList = ['Michelangelo', 'Leonardo', 'Donatello', 'Raphael']
```

- Empty list: []
- Ordered
- Can index: `ninjaTurtlesList[1] = 'Leonardo'`
- Mutable! We CAN add 'Splinter'! We CAN change elements!
- Mix of element types, it could be:

```
ninjaTurtlesList = ['Michelangelo', 'Leonardo', 'Donatello', 'Raphael', 3, 2.66]
```

- No funky stuff: `ninjaTurtlesList[1:2] = ['Leonardo']`

Useful remarks

Dictionary: {}

```
ninjaTurtlesDict = ['Michelangelo' : 'Leader', 'Leonardo' : 'Sniper', 'Donatello' :  
'Explosives', 'Rafael' : 'Medic']
```

- Empty dictionary: {}
- There is a key
- 'Michelangelo' – key0, 'leader' – val0
- Mutable! We CAN add 'Splinter' : 'Chief'!

```
ninjaTurtlesDict['Splinter'] = 'Chief'
```

- *Quickly check:*

In: 'Givi' in uselessSeparatistsDict

Out: False

(!!!!!!!!!!!!!!HILARIOUS, 26.01.2017!!!!!!!!!!!!!!)

HILARIOUS!!! In January it was:

...and in 1 week it became! :-D

- *Quickly check:*

In: 'Givi' in uselessSeparatistsDict

(!!!!!!!!!!!!!!HILARIOUS, 26.01.2017!!!!!!!!!!!!!!)

Out: False

Meeting III: 10 words

Key points of the second meeting

- Quotes - лапки
- Curly braces – фігурні скобки
- Square brackets – квадратні скобки
- Alias – «псевдонім» (дзеркало)
- Tuple – кортеж
- To append - приєднати
- To extend – продовжити
- To split – розділити, розколювати
- Pointer – вказівник
- Tutor - репетитор

Homework till Meeting IV (09/02/17)

Homework for the following week

- PSet2 for “less comfortable” + listen Lecture 5 & Lecture 6
- Pset3 for “more comfortable”
- Create GitHub account for “more comfortable”
- START YOUR PREPARATION FOR MIDTERM!!! 😊

Midterm: 29.06.2017

Key points:

- You can use laptop
- You can google. But everything can be solved just by your memory.
- Don't be afraid – minor mistakes will not count

Office Hours II

America House, Saturday, 17/06/2017, 10:00 – 14:00...but w/o me 😊

Ukraine, Mykoly Pymonenka St, 6, Київ

Don't forget Passport/Driving License!

Andrey: 050 44 33 585

Thank you!